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10/751,303	01/02/2004	Kay Y. Blohowiak	01-942A	8803

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EXAMINER	
SELLMAN, CACHET I	

ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/751,303	BLOHOWIAK ET AL.	
	Examiner	Art Unit	
	CACHET I. SELLMAN	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-34,37-40,42-44,63-66 and 72* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-34,37-40,42-44, 63-66 and 72* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claims 72 and 25-34, 37-40 and 42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The newly presented claim 72 has the limitation of forming oxy-hydroxide layers on the surface of the grit blasted metal foil followed by applying a sol gel coating on the oxy hydroxide layers. The specification states that the metal material is placed into a caustic conditioner where a caustic solution is applied and a control layer of metal oxy hydroxide layer is formed for sufficient chemical bonding then further states that the caustic solution is washed off the material and the sol gel coating is applied to the material (see page 4 of the specification). It is unclear to the Examiner how the sol gel coating is applied to the oxy hydroxide layer if the solution is removed from the material by rinsing as stated in the specification. The specification does not provide support or show that the oxy hydroxide layer is still present after the rinsing step and prior to the formation of the sol gel coating. The limitation of applying the sol gel coating to the oxy-hydroxide layer is not supported by the specification.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claim 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al.

Zheng et al. discloses a process for treating metal surfaces with a composition to prepare the metal for subsequent bonding. The process comprises the steps of cleaning the metal surface by using a caustic solution of 10 % sodium hydroxide (see col. 7, lines 15-17); followed by immersion in tap water to rinse the metal surface (see col. 7, lines 18-19); a sol-gel is applied to the metal material (see abstract); evaporating the water portion of the sol-gel (see col. 7, lines 49-53) and followed by applying an epoxy adhesive (see col. 8, lines 35-42).

Zheng et al. teaches that a primer is optional in order to reduce the chemical activity of the adherent coatings which can absorb contaminants. Since Zheng et al. teaches the optional use of the primer, it is within the scope of Zheng et al. to apply the adhesive directly to the sol-gel coating especially if the chemical activity is at an optimal level to where the contaminants will not absorb.

Zheng et al. fails to teach grit blasting the metal material with a mixture of fine particles of aluminum oxide in air and water, wherein the grit has a mesh size of about 180-320.

Vaughan et al. discloses a process for cleaning titanium alloy to remove oxide coating. The process includes cleaning the alloy (column 2, lines 17-19) using grit blasting with 50 micron alumina, water rinsing, immersing in a solvent and water rinsing (column 4, lines 34-38).

Grylls et al. teaches a method for coating a turbine airfoil where the airfoil is grit blasted to improve the surface finish. The airfoil can be grit blasted using particles mixed with compressed air and water vapor [0020] where the particles are alumina [0022]. Grylls et al. teaches that pressures and sizes must be controlled to prevent chipping of the surface. The grit size can be smaller than 60 mesh and preferably smaller than 220 mesh [0022].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. in view of to include the grit removal process of Vaughan et al. and grit blasting using water, air and alumina as taught by Grylls et al. One would have been motivated to do so because all teach processes of cleaning a metal substrate using grit blasting, Vaughan et al. teaches that the grit can be removed by water rinsing and is later immersed in solvent which is a step in the process of Zheng et al. and Grylls et al. teaches that by blasting with water vapor, air, and alumina improves the surface finish of the metal as well as prevents chipping of the surface therefore one would have a reasonable expectation of success in cleaning the metal substrate.

Konieczny discloses that grit blasting is used in a variety of manufacturing processes. Aluminum oxide particles of a selected size are directed against a surface to be blasted by compresses air or water. The goal is to create a surface

having a roughness within a certain range, which is achieved by varying the size of the alumina grit, and the air pressure (column 1, lines 16-24).

It would have been obvious to one having ordinary skill in the art to modify the process Zheng et al. in view of Grylls et al. and Vaughan et al. to include the mesh size of about 280. One would have been motivated to do so because Konieczny teaches that the mesh size is a result effective variable because it controls the surface roughness. Therefore it would have been obvious to one having ordinary skill in the art at the time to use the mesh size within the claimed range through routine experimentation in order to obtain a desired surface finish especially absent any criticality in using the claimed range.

Zheng et al. teaches that the sol gel is comprised of a metal alkoxide; water, an organoalkoxysilane comprising silane coupling groups capable of bonding with the material to be bonded with the metal surface and an acid which promotes hydrolysis and crosslinking of the metal alkoxide and organoalkoxysilane (see abstract). The metal alkoxides can be made of silicon, aluminum, titanium, zirconium, tantalum and hafium dependent on the type of substrate being used (see col. 4, lines 49-65). Zheng et al. does not teach the combination in claim 43.However, it was well known in the art to use zirconium alkoxide, 3-glycidoxy-propyltrimethoxysilane, and glacial acetic acid (see col. 3,lines 3-10). Blohowiak et al. also reaches that the sol gel mixture can be an organozirconium compound such as tetra n-propyxyzirconium (see co.. 4, lines 28-35).

Blohowiak et al. states that the mixture can have surfactants or thixotropic agents in solution to improve the spray characteristics. The surfactants or thixotropic agents help to provide a more uniform sprayed coating and improve the manufacturability of the process. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a surfactant in the mixtures. One would have been motivated to do so because Blohowiak et al. teaches using surfactants improves the spray characteristics of the solution; provides a more uniform spray coating; and impoves the manufacturabiltiy of the process therefore one would have a reasonable expectation of success of applying the sol gel.

Blohowiak et al. teaches that use of a zirconium alkoxide will produce a tight bond with oxygen which does not dissociate during operation. The higher the bond strength prevents dissolution of the oxide layer, so that the Zr component in the sol coating functions as an oxygen diffusion barrier as well as a good adhesion bond (see col. 2, lines 37-55) therefore it would have been obvious to one having ordinary skill in the art to use the Zr alkoxide in the process of Zheng et al. in order to produce an oxygen diffusion barrier as well as a strong adhesive bond.

Zheng et al. does not teach an epoxy based adhesive having a composition as listed in claim 43. However, Zheng et al. teaches the use of common epoxy adhesives such as EA-9649 which according to WO/1994/026994 consists of epoxy resin of trifunctional aromatic glycidyl ether and epoxidized novolac and a curative 4,4' diaminodiphenyl sulfone. This

adhesive lacks the caroxy-terminated acrylonitrile butadiene rubber as required by claim 4.

Shimizu et al. teaches the application of an adhesive to a metal plate where the adhesive comprises a first epoxy compositon and a second composition then the composition is cured by heating the modulus elasticity in tension sufficient to increase the stiffness of the metal (see abstract). Shimizu et al. teaches that the epoxy resins can be glycidyl ether type and can be used alone or in combination with each other depending on the desired physical properties of the epoxy resin composition. The resin includes hardeners that are used to exhibit curing action upon heating such as 4,4'-diaminodiphenylsulfone in amounts between 1-15% by weight of the total epoxy resin (col. 3, lines 32-50). Shimizu et al. teaches that various additives can be used such as high molecular weight epoxy resins derived from bisphenol A and butadiene acrylonitrile copolymers in the amount of 5-100% by weight which increases the formability of the adhesive (col. 3, lines 57-64). Shimizu et al. teaches the use of 35 parts of bisphenol A type liquid epoxy rein with 50 parts bisphenol a type solid epoxy resin (col. 5, lines 63-66). Shimizu et al. also teaches the use of 10% of carboxyl group containing nitrile rubber (see col. 6,l ines 37-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the epoxy material of Shimizu et al. using the amounts of the claim through routine experimentation especially absent any criticality in using the claimed range. One would have been motivated to do so because Shimizu et al. teaches that the amount and components of the mixture affected the overall

cohesive force, sag, viscosity, and wetting properties of the resin (see col. 3, lines 51-56) therefore one would have a reasonable expectation of success in applying the adhesive to the metal substrate.

Dow Product Information states that novolac resin has higher functionally than standard bispheol A based epoxy resins and has good thermal stability, mechanical strength and resistance against chemicals. The novolac resin produces a more tightly cross-linked cured system than bisphenol A based liquid epoxy resins.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the adhesive of Shimizu et al. and use the novolac resin in Dow Product Information. One would have been motivated to do so because both discloses resins that can be used in adhesives and Dow Product Information further teaches the advantages of improved temperature performance, mechanical strength and resistance to various chemicals when using novolac over epoxies formed from bisphenol A.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. to include applying the epoxy mixture of Shimizu et al. and Dow Product Information. One would have been motivated to do so because both discloses applying epoxy adhesive to a metal substrate and Shimizu et al. further teaches that the adhesive does not have the problem of forming strain and depression in the metal therefore one would have a reasonable expectation of success in applying the epoxy resin.

In regards to applying a thermoplastic backing sheet to the adhesive to protect the metal from sticking to itself, it is known in the art to use such materials when forming materials used for vehicle parts that are being coiled as being taught by Simons et al. (col. 1, lines 10-19, abstract, col. 3 lines 19-24). Simons et al. discloses degreasing a metal strip, applying an adhesive to the strip followed by applying an anti adhesive film which can be formed of a release lacquer to the adhesive coated strip and then coiling the strip. Simons et al. does not specifically teach that that the anti-adhesive film is a thermoplastic material, however, it is well known in the art to use such materials especially PET to prevent the sticking of an adhesive to itself when coiling (see Kurtz et al. (US 49476758 col. 16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. to include the use of a backing film in order to prevent the sticking the adhesive during a coiling process of the metal material as taught by Simons et al. One would have been motivated to do so because both are directed towards using the metal material in automobile parts and Simons et al. teaches an operable way of protecting the metal material until use.

The metal surface can be aluminum, titanium, and steel (see col. 4, lines 1-6 of Zheng et al.) as required by claim 44.

4. Claims 63-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et

al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. as applied above and in further view of Montano.

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. fails to teach applying the epoxy by spraying or dipping as required by claims 63-64.

Montano et al. teaches a method for treating adhesion promoted metal surfaces with an epoxy resin. Montano et al. discloses a process of roughening a metal surface, applying an adhesion promotion composition to the metal surface then coating it with an epoxy resin composition (abstract). Montano et al. also teaches that the epoxy resin composition is can be applied by spray coating, dip coating, roller coating, or any suitable method to apply an epoxy resin (column 9, lines 41-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. as modified above to apply the adhesive using the methods of Montano et al. One would have been motivated to do so because both discloses processes where a metal in coated with an adhesion promotion composition then coating with an epoxy resin and Montano et al. further discloses alternative methods of applying the resin therefore one would have a reasonable expectation of success in applying the adhesive coating to the metal.

5. Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al.,

Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. as applied above and in further view of Poutasse et al.

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. fails to teach the use of acetone as a solvent.

Poutasse et al. discloses applying an epoxy adhesive to foil to produce a laminate. Poutasse et al. teaches that the adhesive contains a solvent where the solvent can be acetone (column 4, lines 55-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. as modified above to include the solvent of Poutasse et al. One would have been motivated to do because both disclose processes for applying an epoxy adhesive that contains an epoxy novolac, bisphenol epoxy resin to a foil to make a laminate where the foil is roughened before the adhesive is applied and Poutasse further teaches that the adhesive contains a solvent therefore one would have a reasonable expectation of success in forming the epoxy adhesive.

6. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. as applied above and in further view of Tola.

Zheng et al. in view of Shimizu et al., Dow Product Information, Simons et al., Krutz et al., Vaughn, Grylls, Koneiczny, and Blohowiak et al. fail to teach applying the adhesive at the claimed thickness.

Tola discloses a method for forming a foil/dielectric laminate by applying an epoxy resin to the foil, baking the adhesive in an oven to remove the solvent in the adhesive, which dries the adhesive and reduces the thickness of the layer to about 0.4 mils. The thickness is a result effective variable, which depends on the curing conditions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the thickness within the claimed range through routine experimentation in order to ensure that the foil is laminated to the dielectric especially since there is no evidence in using the thickness in the claimed range.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Zheng et al. as modified to include applying the adhesive at the thickness as taught by Tola. One would have been motivated to do so because both disclose applying an epoxy to a foil for form a laminate and Tola teaches a process where a laminate is formed using an epoxy applied to a foil therefore one would have a reasonable expectation of success in forming the laminate.

Response to Arguments

7. Applicant's arguments filed 1/30/2009 have been fully considered but they are not persuasive. As to claim 43, the applicant's argue that Vaughn does not teach grit blasting. However, the applicant failed to address the other references in the rejection which all show a process for treating a metal surface by cleaning prior to subsequent steps as shown by the prior art of Vaughn, Grylls and Konieczny therefore the rejection is maintained.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CACHET I. SELLMAN whose telephone number is (571)272-0691. The examiner can normally be reached on Monday through Friday, 7:00 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Cachet I Sellman
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